E/CONF.39/B/60
2 Nov.1962
ORIGINAL : ENGLISH

UNITED NATIONS CONFERENCE
ON THE APPLICATION OF SCIENCE AND TECHNOLOGY
FOR THE BENEFIT OF THE LESS DEVELOPED AREAS

Agenda Item: B.2.1

United States of America

MANPOWER PROJECTIONS AND TECHNIQUES

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MANPOWER PROJECTIONS AND TECHNIQUES

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1. The development of national economic goals must take into account the future availability of manpower in adequate amounts and possessing required skills and education.

2. Dynamic changes in the United States economy have made it essential to develop techniques to anticipate future needs for workers, especially highly trained professional, technical scientific and skilled workers, with the aim of avoiding shortages that will hamper economic growth on the one hand, and structural unemployment on the other. Many of the problems associated with manpower policies in the United States are shared in common with other nations--both those already technologically advanced as well as the less developed ones. It is the purpose of this paper to describe some of the techniques utilized in the preparation of projections of manpower requirements and resources in the United States and to discuss briefly their application to developing nations.

3. The starting point for projecting manpower requirements is to project a model of the economy relating the total output of the economy at given levels, and the output of individual sectors, to levels of employment. Customarily this has involved two methods.

4. The first assumes that a given level of output will be achieved in a target period, represented by a desired level of income and consumption, or resulting from an assumed growth rate of the economy.

5. The second method--and most commonly used in the United States--is to examine the implications for manpower demand and the economy's resources by assuming they are fully utilized in the target period. This begins with a projection of the supply of labor, based on an evaluation of population trends (since the number of persons available for work depends largely on the population of working age at any given time). Data relating to population projections include figures on age and sex characteristics, and information on births, deaths, and in-and-out migration.

6. Estimates of labor force supply are accordingly derived by evaluating trends in the proportion of the population participating in the labor market. Where data for current and past periods are available, projections are made by detailed age-sex characteristics because of substantial differences among groups in their participation in the labor force. Sharp changes in labor force participation should be anticipated in an economy undergoing the transition from an agrarian to an industrial nation. Estimates of total employment are derived, based on assumed levels of frictional unemployment, work time and productivity changes.

7. Given estimates of aggregate output and employment, the next procedure is to provide detailed projections of industrial and occupational employment. Whereas estimates of labor force are significantly related to demographic variables (which are less likely to shift drastically in short periods), labor requirements are generally harder to estimate because of complex relations existing between the overall level of economic activity and the requirements of the subordinate components which dictate the number and kinds of jobs necessary to produce the total of goods and services. Among the factors affecting the need for labor in specific industries are the amount of domestic production of individual goods and services, changes in output per man-year in each industry, etc.

8. Because it is not practical to take into account explicit recognition of all the specific factors involved, analysts in the United States have sought simpler procedures for most segments. In general three types of approaches, based on past data and relationships, have beem employed in relating estimates of total economic activity to individual industries.

(a) One approach is based on the assumption that the change in employment of individual industries varies characteristically with movements in total employment; hence individual industry employment is derived from projected total employment. Employment in industries whose levels are determined in large measure independently of levels of national employment--such as agriculture and government--are projected separately. This method is useful in the first approximation and has the advantage of simplicity. However, it requires data for many previous years, is a mechanistic approach whose validity becomes weak in long-range projections, and its determinations could be misleading if new factors involving technological change and shifts in demand are not taken into consideration.

(b) A second approach is based on the relation between the production of individual industries with total projected production, which estimates are subsequently translated into employment estimates. This method, while still essentially mechanistic, provides greater opportunity for checking internal consistency, so that if original calculations appear to give distorted results, corrections can be made before the translation of products to employment is made. In this translation, changes in productivity and average hours worked must also be considered. These statistical data are more demanding, however, requiring information not only on employment but also on production, price changes, and hours of work by appropriate industry classification.

(c) The most complex and sophisticated method is to allocate total production among the various industries by use of interindustry coefficients. This requires economic and technical data covering the entire economy in a comprehensive and exceedingly detailed manner. This procedure, while requiring data on intermediate as well as final demand, permits the examination of the effects of varying assumptions on future trends in the economy. Development of an interindustry matrix requires vast processing of detailed production and shipments data.

9. A useful tool of analysis in projecting employment by occupation has been the occupational industry matrix. It presents information for some 150 industries comprising the total economy by the absolute and relative distribution of employment in about 150 occupations. Because this tool is static in nature, consideration must be given to changes in the future occupational composition, taking into account shifts in productivity and job functions related to changing technology. Use of the matrix is exemplified in a recent Labor Department study, "The Long-Range Demand for

Scientifi′ and Technical Personnel," in which a major effort was made to examine the relationships of scientific and technical employment with other economic indicators capable of being used for projection purposes.

10. After occupational requirements have been determined, estimates of the occupational supply side are made, based on a determination of the current supply of workers by occupation. Estimates must then be prepared on the additions to and withdrawals from each occupational group. In addition, other factors such as the transferability of skills among occupations, and changing labor force participation rates must be considered. Transferability, for example, is easily accomplished among relatively unskilled occupations, but even at higher levels including the professional, there is some shifting among fields of discipline. An efficient device for measuring withdrawals from an occupation are the tables of working life developed by the U. S. Bureau of Labor Statistics.

11. In the United States, the basic source of occupational data is the Census of Population; current data for broad occupational groups is provided by the Labor Department's Monthly Report on the Labor Force, based on a monthly sample survey. Estimates of occupations requiring formal training are often available from educational institutions, training facilities or licensing authorities. For other groups, unfortunately, even imprecise data are generally not available. It is anticipated that research programs undertaken by the Office of Manpower, Automation and Training of the United States Department of Labor will develop data on numbers of persons obtaining training from various sources.

12. Although differences in the political and economic framework do not permit the exact duplication of American techniques in developing economies, there are useful elements applicable with differing degrees of emphasis. In an established industrial economy it is feasible to project manpower requirements by extrapolating past trends, assuming an orderly continuation of the process of economic development. Because previous growth in a developing economy is not acceptable as a standard for future development, manpower projections in practice are related to the magnitude and nature of the economic goals established beforehand.

13. In many cases, data from other countries can be more useful than data for the subject country, for example, by developing occupational requirements for projected industry levels where the industry does not yet exist in its projected form. Or, it can be assumed that the occupational distribution at the projected level may be similar to that in some more developed country at the current or some previous stage.

14. The Puerto Rican example has direct bearing on this adaptive procedure. In the 1957 projection of Puerto Rico's manpower needs for the year 1975, it was assumed, on the basis of a projection of previous trends, that the productivity and occupational mix of most sectors would be the same in Puerto Rico in 1975 as on the United States mainland in 1950. This provided a framework for determining the number and kinds of specific skills needed to achieve the industry pattern projected for 1975.

15. The value of the projections is that work can then proceed on the development of manpower needs through programs of education and training. Where shifts in technological processes are encountered--and they should be anticipated--a system of retraining and upgrading must be provided for. Even though modifications during the period of economic development will be required, manpower projections serve as a standard for measuring performance and as a guide for action.

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